

studying magic than in ruling his kingdom. It is quite clear, when we look at the history of the period, that the kingdoms of the Medes, Persians, Babylonians, Assyrians, and Egyptians had become effete, and that the time for the coming of the Macedonian hero had arrived. As soon as Alexander began to attack them they fell before him like corn before the sickle, and the Oriental nations, exhausted by centuries of luxury, formed a comparatively easy prey for the warlike Greeks.

Such, in brief outline, is a sketch of the contents of M. Maspero's interesting volume. In the limits of a short notice it is impossible to discuss details, much less differences of opinion, and now the work is done it is easy to see where improvements could have been made. In matters relating to Egyptology, M. Maspero's opinion is generally sound; but it goes without saying that when he finds it necessary to refer to cuneiform literature, he is obliged to do so at second hand. There is no discredit attaching to him for this necessity when discussing native records of Babylonia, Assyria, and Persia; only the reader of the work before us must remember that M. Maspero merely repeats what experts in cuneiform have written in their books. The references are full and are honestly given; and if the reader seeks further information, it is only necessary for him to consult the authorities whose names are given in the notes, when he will be in a position to judge for himself. Whether it was wise for M. Maspero to attempt to cover such a vast field of study—a work which to do successfully involves a good knowledge of several difficult Oriental languages—is a matter which we do not care to decide; but there is no doubt that he has written an interesting book, and one which will give the reader a good general view of a most eventful period in the history of the world.

AMERICAN ICHTHYOLOGY.

The Fishes of North and Middle America: a Descriptive Catalogue of the Species of Fish-like Vertebrates found in the Waters of North America, North of the Isthmus of Panama. By David Starr Jordan and Barton Warren Evermann. Part I. Pp. lx+1240 (1896). Part II. Pp. xxx+1241-2184 (1898). Part III. Pp. xxiv+2185-3136 (1898). (Washington: U.S. National Museum.)

THIS work forms No. 47 of the *Bulletin* of the United States National Museum; the third volume reached this country last year; and a fourth, which will contain a complete table of contents of the whole work, addenda, and a representative selection of illustrations, is still to come.

The present work is, in some measure, a revision of the "Synopsis of the Fishes of North America," which the senior author published in conjunction with Dr. Gilbert in the year 1882 as No. 16 of the *Bulletin* mentioned, and which, up to the present time, has been of such great service to the student of North American fishes. In this "Synopsis," however, all fishes were excluded from south of the boundary between the United States and Mexico, and no distinct attempt was made to draw a line between the marine fishes of the

Southern States and those of the West Indies. The present work has a much wider scope: the marine fauna is extended southwards to the equator, and that of the freshwater to the Isthmus of Panama; the whole of the West Indies, the Caribbean Sea, the waters of the Gulf Stream, and the Galapagos Archipelago are included. Towards the north, the fishes not only of the Alaska Sea, but also those which are known from Kamtchatka and the Kurile Islands, form part of the work. Thus, the number of species that had been described in the "Synopsis" is nearly doubled, and amounts to 3127 in the present catalogue, besides about a hundred which are added in a supplement at the end of the third volume. The pagination runs continuously throughout the three volumes, a plan the advantage of which is doubtful, as, in referring to a species, it will not enable us to dispense with noting the volume in addition to the page. Some 260 pages of the last volume are taken up by an artificial key to the families of "true fishes," a glossary of terms, and a general alphabetical index; the latter seems to have been prepared with great care, and has never failed us on the occasions we had to refer to the work.

The mode of treatment of the subject is uniform throughout the work. A diagnosis is given of each of the genera and higher divisions, and followed by a key to their constituent parts. The species are concisely, sometimes more fully, described, either from actual specimens or from previously published accounts, with a few notes on their geographical range or their economic importance. We shall subsequently refer to the synonymy.

It will be apparent from these notes that the work initiated by Dr. Jordan was a serious and very laborious undertaking. It could be successfully carried through only by men who through long and patient inquiry and study had acquired an intimate acquaintance with both the fishes and the literature of their country, who had at their disposal the large accumulations of specimens in the museums of the United States, and who at the same time possess in a rare degree the gifts of methodical work and energetic application. These conditions were amply fulfilled in Dr. Jordan and his coadjutor. Dr. Jordan seems to have commenced his ichthyological studies as far back as 1875, and we see from a list dated 1890 that in the intervening fifteen years he published more than two hundred papers on North American Ichthyology, many of them of considerable extent. Of his pupils and colleagues he imbued some with his own love of ichthyology, and when we consider that his duties as President of the Indiana, and later of the Stamford University, and as Commissioner of the Fur Seal Fisheries, must have taxed his time to the utmost, we cannot be surprised that he found it beneficial for the progress of the work under review, to join forces with Dr. Evermann, himself an author of many original papers on American fishes.

Two features of the work characteristic of American Ichthyology, to which the European student, at any rate, the writer of this notice, will be scarcely reconciled, obtrude themselves too forcibly to be passed over in silence. One is the excessive subdivision into families and genera: the 3127 species are relegated to no less than 223 families and 1077 genera, leaving out of con-

sideration the subgenera which are not numbered, and which we are afraid to count. Then, the authors have adopted a set of rules which, when applied to ichthyology, make the greatest possible disturbance in previously accepted nomenclature. So-called rules of priority are made retrospective, uniformly and pedantically: reasons which induced elder authors to select certain names for their genera are set aside, and not even Linnæus himself is allowed to change his own names; no regard is to be paid to the character and spirit of a work in which the names take their origin; a name by a Rafinesque or Swainson deserves as much consideration as one given by Cuvier or Rüppell. Both these methods result in a nomenclature which is more or less difficult to grasp by a European systematist.

Finally, we have to refer to the manner in which the authors have dealt with "synonymy." This seems to us too scanty to satisfy the wants of the student either of systematic ichthyology or of the American fauna. The authors announce as the principle by which they have been guided, to give "enough synonymy to connect this work with other descriptive works, and no more"; and of such works they mention the first descriptions that have been given of supposed new species or genera, the "British Museum Catalogue of Fishes," Jordan and Gilbert's "Synopsis," and "other works in which special information is given." No objection could be taken to the adoption of this principle, but we fail to see that the authors have strictly adhered to it. What we expect in a work specially devoted to a fauna, is full reference to every paper in which our knowledge of the species of that fauna has been advanced in some respect. Considering the vast amount of ichthyological literature scattered through the American periodicals, a more perfect collection and arrangement of references would have been of great benefit to the student, though, we admit, a work of considerable labour.

We will mention only one case to show that the scantiness in their references may even cause inconvenience to the student. The ichthyological parts of the Reports of the United States Survey Expeditions were prepared by Charles Girard, and published about the middle of the present century; they form a considerable portion of those quarto volumes, and were very liberally illustrated. A great number of forms were described in them, and we learned from them at any rate that a large contribution to our knowledge of the American fauna had been made in the collections of those expeditions. Unfortunately, the treatment of the subject by the naturalist mentioned was not satisfactory, and it seemed most desirable that the typical specimens should be re-examined and the descriptions revised. What position, now, do these reports take in the "Fishes of North and Middle America"? Indeed, the names of the Girardian species appear therein without exception, many as synonymous with other species, a part as valid species, but reference to an examination of the several types is made only in some of the cases. Thus, of eighteen species described by Girard as *Alburnops* and *Moniana*, reference to a type is made only in eight. Further, the authors refer only to preliminary descriptions in the *Proceedings* of the Philadelphia Academy, rarely to the enlarged edition in the "Reports," and

almost every mention of the numerous illustrations prepared and published at the expense of the United States Government is omitted. Probably, a great number of those types, which were deposited in the Museum of the Smithsonian Institution, are lost by this time, thus depriving the identifications made by Drs. Jordan and Evermann of much of their authoritative value or finality. Possibly, the authors consider those reports, or at least the illustrations, not reliable enough to be safely quoted: an opinion expressed by the writer of this notice some thirty years ago; but it would have been well if the authors had given some explanation of the matter in their preface or introductory note.

A work like the one under review, composed at it is of an immense amount of technical details, which only too frequently have to be gathered from imperfect or even misleading sources, cannot fail to lay itself open to criticism on points of minor importance. But it would be most unjust to the authors to allow such real or supposed imperfections to detract from the high merits of their work. It was one of the greatest desiderata in Ichthyology. It is a faithful representation of our present knowledge of American fishes, and will form the basis for all researches in that field for some time to come. For how many years? Those are, in our experience, the most useful systematic works which most stimulate the activity of new workers, and, as a natural consequence, soonest yield their position to the progress of discovery and the accumulation of new facts. We anticipate that the "Fishes of North and Middle America" will prove to be one of those works, and hope that, when once a new edition will be required, the strength and knowledge of the authors will still be available for this task. Next to the authors, science is greatly indebted to the Secretary of the Smithsonian Institution for having undertaken the publication of such an extensive work, following so soon the appearance of "Oceanic Ichthyology." The publication of these two monumental works in Ichthyology stand now to the credit of the Smithsonian Institution.

A. G.

ASTRONOMICAL PHOTOGRAPHY.

Die Photographie der Gestirne. Von Dr. J. Scheiner, a.o. Professor der Astrophysik an der Universität Berlin, und Astronom am Königl. Astrophysikalischen Observatorium zu Potsdam. Pp. iv+382; 1 plate and 52 figures, with an atlas of 11 plates. (Leipzig: Engelmann, 1897.)

DR. SCHEINER'S book has been before the public for some time, and it is to be regretted that we have not had an earlier opportunity of calling attention to its contents and expressing an opinion on its merits. For a book of this character cannot but grow out of date as processes become obsolete, and as improved methods are adapted. Astronomical photography is essentially a progressive science, and when Prof. Scheiner compiled this book, many of the methods employed were admittedly tentative and not accepted beyond dispute. The direction of the further development of photographic practice was not decided, and even the instrumental equipment best adapted to its ends was, and still is, not settled with certainty. This is no proof that such a book